

Notice of Allowability

Application No.

10/725,762

Examiner

Erick Rekstad

Applicant(s)

XU ET AL.

Art Unit

2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to application filed 12/1/2003.
2. ☒ The allowed claim(s) is/are 1-12 and 32-53.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date 12/1/03
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 12/14/07
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

This is a Notice of Allowance for Application no. 10/725,762 filed on December 1, 2003.

Election/Restrictions

This application contains claims directed to the following patentably distinct species:

1. Generating layers using a high-quality reference image (Claims 1-12).
2. Transmitting layers (Claims 13-20).
3. Switching bit-rate based on a function of two enhancement layer bit-rates and transmitting a difference bitstream (Claims 21-31).

The species are independent or distinct because each contains unique features not required by the other embodiments.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, there is no generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

During a telephone conversation with Brian Hart on December 14, 2007 a provisional election was made without traverse to prosecute the invention of

Group 1, claims 1-12. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-31 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

This application is in condition for allowance except for the presence of claims 13-31 directed to Groups 2 and 3 non-elected without traverse.

Accordingly, claims 13-31 have been cancelled.

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Brian Hart on December 14, 2007.

Claims 1 and 9 are amended, non-elected claims 13-31 are canceled, new claims 32-53 are added.

The application has been amended as follows:

1. (Currently Amended) A method comprising:

generating a base layer bitstream and a plurality of independent enhancement layer bitstreams of a first video frame, each bitstream encoded from the first video frame and an associated high-quality reference image from the independent enhancement layer bitstreams, the high quality reference image having an associated high quality reference bit-rate;

determining a switching bit-rate associated with an available bandwidth of a network; and

selecting a first independent enhancement layer bitstream from the plurality of independent enhancement layer bitstreams of the first video frame based on the switching bit-rate.

9. (Currently Amended) A method as recited in claim 1 further comprising encoding the base layer bitstream and the plurality of enhancement layer bitstreams according to an H.26L or H.264 video standard.

13-31 (Canceled)

32. (New) A system comprising:

means for generating a base layer bitstream and a plurality of independent enhancement layer bitstreams of a first video frame, each bitstream encoded from the first video frame and an associated high-quality reference image from the independent enhancement layer bitstreams, the high quality reference image having an associated high quality reference bit-rate;

means for determining a switching bit-rate associated with an available bandwidth of a network; and

means for selecting a first independent enhancement layer bitstream from the plurality of independent enhancement layer bitstreams of the first video frame based on the switching bit-rate.

33. (New) A system as recited in claim 32 wherein the generating operation comprises concurrently generating the plurality of independent enhancement layer bitstreams.

34. (New) A system as recited in claim 32 further comprising:

means for generating a plurality of independent enhancement layer bitstreams of a second video frame, each bitstream being generated from the second video frame using the associated high quality reference bit-rates;

means for selecting a second independent enhancement layer bitstream from the plurality of independent enhancement layer bitstreams of the second video frame; and

means for generating a difference bitstream representing a difference between the first selected independent enhancement layer bitstream and the second selected independent enhancement layer bitstream.

35. (New) A system as recited in claim 32 wherein the determining operation comprises estimating a switching bit-rate associated with two of the plurality of independent enhancement layer bitstreams, such that distortion values associated with transmission of the two enhancement layer bitstreams are substantially equal.

36. (New) A system as recited in claim 32 wherein the determining operation comprises:
estimating a switching bit-rate between a pair of the high quality reference bit-rates of two of the plurality of independent enhancement layer bitstreams, the estimated switching bit-rate based on distortion values associated with transmission of the two enhancement layer bitstreams; and
adding a buffer bit-rate to the estimated switching bit-rate, the buffer bit-rate corresponding to a level of fluctuation of the network bandwidth.

37. (New) A system as recited in claim 32 wherein the high quality reference bit-rates associated with the enhancement layer bitstreams are successively higher.

38. (New) A system as recited in claim 32 wherein the determining operation comprises computing a switching bit-rate as a function of at least two high quality reference bit-rates associated with two adjacent enhancement layer bitstreams in the plurality of enhancement layer bitstreams.

39. (New) A system as recited in claim 38 wherein the computing operation comprises computing an average bit-rate between the at least two high quality reference bit-rates.

40. (New) A system as recited in claim 32 further comprising transmitting the base layer bitstream and the first independent enhancement layer bitstreams.

41. (New) A system as recited in claim 32 further comprising:
means for receiving the base layer bitstream and the first independent enhancement layer bitstream; and

means for decoding the base layer bitstream and the first independent enhancement layer bitstream to display the first video frame on a display device.

42. (New) A system as recited in claim 32 wherein the generating operation further comprises: generating the base layer bitstream by applying motion estimation to the first video frame and a plurality of high-quality reference images having associated high quality reference bit-rates.

43. (New) A computer-readable medium having stored thereon computer-executable instruction for performing a method comprising:
generating a base layer bitstream and a plurality of independent enhancement layer bitstreams of a first video frame, each bitstream encoded from the first video frame and an associated high-quality reference image from the independent enhancement layer bitstreams, the high quality reference image having an associated high quality reference bit-rate;

determining a switching bit-rate associated with an available bandwidth of a network; and

selecting a first independent enhancement layer bitstream from the plurality of independent enhancement layer bitstreams of the first video frame based on the switching bit-rate.

44. (New) A computer-readable medium as recited in claim 43 wherein the generating operation comprises concurrently generating the plurality of independent enhancement layer bitstreams.

45. (New) A computer-readable medium as recited in claim 43, the method further comprising:

generating a plurality of independent enhancement layer bitstreams of a second video frame, each bitstream being generated from the second video frame using the associated high quality reference bit-rates;

selecting a second independent enhancement layer bitstream from the plurality of independent enhancement layer bitstreams of the second video frame; and

generating a difference bitstream representing a difference between the first selected independent enhancement layer bitstream and the second selected independent enhancement layer bitstream.

46. (New) A computer-readable medium as recited in claim 43 wherein the determining operation comprises estimating a switching bit-rate associated with two of the plurality of independent enhancement layer bitstreams, such that distortion values associated with transmission of the two enhancement layer bitstreams are substantially equal.

47. (New) A computer-readable medium as recited in claim 43 wherein the determining operation comprises:

estimating a switching bit-rate between a pair of the high quality reference bit-rates of two of the plurality of independent enhancement layer bitstreams, the estimated switching bit-rate based on distortion values associated with transmission of the two enhancement layer bitstreams; and

adding a buffer bit-rate to the estimated switching bit-rate, the buffer bit-rate corresponding to a level of fluctuation of the network bandwidth.

48. (New) A computer-readable medium as recited in claim 43 wherein the high quality reference bit-rates associated with the enhancement layer bitstreams are successively higher.

49. (New) A computer-readable medium as recited in claim 43 wherein the determining operation comprises computing a switching bit-rate as a function of at least two high quality reference bit-rates associated with two adjacent enhancement layer bitstreams in the plurality of enhancement layer bitstreams.

50. (New) A computer-readable medium as recited in claim 49 wherein the computing operation comprises computing an average bit-rate between the at least two high quality reference bit-rates.

51. (New) A computer-readable medium as recited in claim 44, the method further comprising transmitting the base layer bitstream and the first independent enhancement layer bitstreams.

52. (New) A computer-readable medium as recited in claim 44, the method further comprising:

receiving the base layer bitstream and the first independent enhancement layer bitstream; and

decoding the base layer bitstream and the first independent enhancement layer bitstream to display the first video frame on a display device.

53. (New) A computer-readable medium as recited in claim 44 wherein the generating operation further comprises: generating the base layer bitstream by applying motion estimation to the first video frame and a plurality of high-quality reference images having associated high quality reference bit-rates.

Allowable Subject Matter

Claims 1-12 and 32-53 are allowed.

The following is an examiner's statement of reasons for allowance: The claims are allowable over the prior art of record since the cited reference taken individually or in combination fails to particularly disclose a method, system or computer readable medium for generating a base layer and enhancement layer bitstreams as required by the claims.

The closes prior art (US Patent 6,292,512 to Radha et al.) discloses a similar method, system and computer readable medium for generation a base layer and enhancement layers (Figs. 6 and 7). Radha is silent on the base layer encoded from the first video frame and an associated high-quality reference image from the independent enhancement layer bitstreams as required by the claims. Note, such a feature is shown in Figure 2 of the present application (218 of Fig. 2). Radha is further silent on the enhancement layers being independent. This feature taken with the other features in the claims teach over the prior art.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

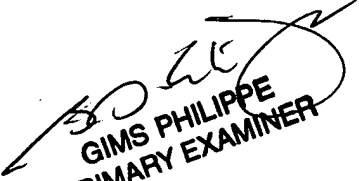
US Patent Application Publication 2003/0169813 A1 to Van Der Schaar.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Erick Rekstad whose telephone number is 571-272-7338. The examiner can normally be reached on 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on 571-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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